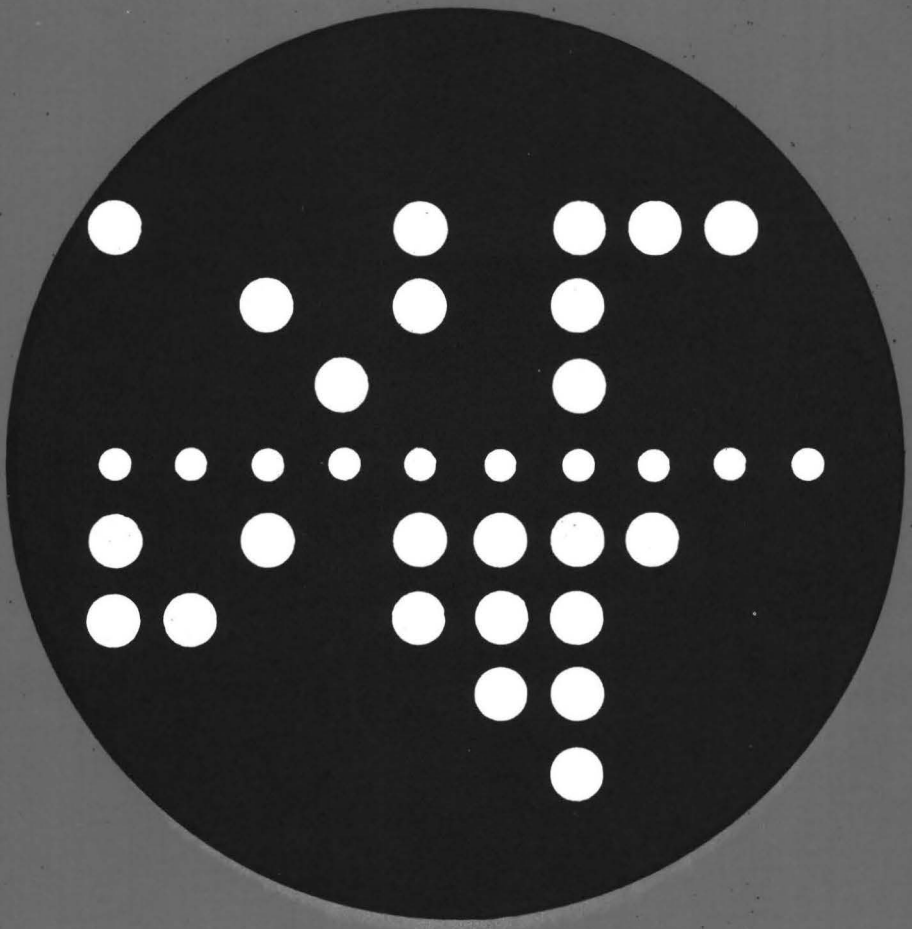
COMPUTING CENTRE NEWSLETTER

May 1979 - N° 31



Commission of the European Communities
JOINT RESEARCH CENTRE
Ispra Establishment

CONTENTS

EDITORIAL NOTE.

The Computing Centre Newsletter is published monthly except for August and December.

It describes developments, modifications and specific topics in relation to the use of the computing installations of the Joint Research Centre, Ispra Establishment.

The aim of the Newsletter is to provide information of importance to the users of the computing installations, in a form which is both interesting and readable.

The Newsletter also includes articles which are of intellectual and educational value in order to keep the users informed of new advances in computer science topics.

Administration and contact address:

Ms. A. Cambon (tel. 730)
Support to Computing
Building 36
J.R.C. Ispra Establishment
21020-ISPRA (Varese)

LEGAL NOTICE:

Graphit - Tektronix
H. I. de Wolde.

Introduction

A new program, "Tektronc" has been developed to display the Graphit Intermediate File, completely or partly, on a Tektronix 4014 or 4015 Terminal.
The main differences between the previously introduced program "Tektronx" and the present program concern:

- Tektronc uses a set of commands instead of the interrogative system of Tektronx.

- A part of the screen has been reserved as a scratchpad, on which the literal communications between the user and the system are displayed.

- The graphic part of the screen may be divided into up to 4 sections each of which may be addressed separately.

- Images may be projected on top of other drawings.

- A windowstack may memorize up to 26 windows.

- The windowstack may be filled either by direct input or by cursor defined windows.

- A time oriented Interrupt System may be used for an early stop during the plot operations.

- The cursor may retrieve coordinates from any of the screen parts.

- An editing option is available to prepare a report version of the image by means of the hardcopy unit; alphanumeric text may be added to the drawing.

Terminology.

Window — An rectangular part of the complete image as represented numerically by the Intermediate File. It is specified by coordinates in centimetres: XMIN, XMAX, YMIN, YMAX.

Windowname — An alphabetical character which names a window.

Windowstack — A series of specified windows; coordinates in centimetres with their single character windowname.

Displaystack — A matrix specifyng numerically the displayed windows by respectively, screentype, screenpart, coordinates of the windows, coordinates of the viewports.

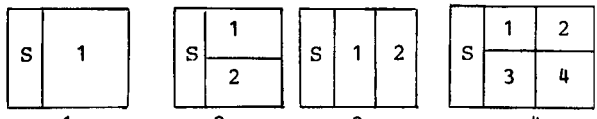
Viewport — A rectangular part of the screen where a picture, or a window in a picture, may be displayed. Coordinates are given in screen points.

Scratchpad — Part of the screen where literal communications between the user and the system are displayed.

Screentype — A subdivision of the screen. At the default option, screentype 1, the screen is divided in a scratchpad, left part, and a square image part. The image part may in turn be divided in up to four parts:

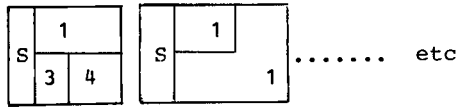
Screentype 2: division in two subscreens, horizontally
Screentype 3: division in two subscreens, vertically
Screentype 4: division in four square parts.

Screenpart Numerical identification of a part of the screen:



Type: 1 2 3 4

in which S = Scratchpad
The screen may belong to different screentypes at the same time i.e. combinations such as the following are allowed:



..... etc

Plotting mode After defining the viewport, by screentype and screenpart, and the window, the user has then to specify a plotting mode:

n - natural, the X,Y, ratios remain unchanged, the image is a reduction of the original while maintaining the proportions.

o - optimal, the viewport is used to its maximal extend, the X,Y proportions are changed.

r - real, starting from the left under point of the window, all distances are maintained. The image is an exact projection of the original. Excessive parts of the window are cut off.

Graphit Commands.

Conventions:

- Only the first four characters of each command are obligatory.
- Commands and arguments are separated by at least one blank.
- A complete instruction may not exceed 28 characters, including blanks.
- Requested integers must be written as integers.
- Real constants may be written as real or as integers.

Commands presently available are:

SUMMARY

The system writes a table with the specifications of the Intermediate File:
Total number of plot operations.
Extreme values of the file picture numbers and picture extremes if relevant.

SCREEN m

m is screentype, default m=1 (see table terminology).

BELL xx

xx = ON (default)
xx = OFF
To set the acoustic signal for attention.

INTERRUPT i

During the display of an image the processing stops any i seconds and waits for a second level command.
The second level commands are:
Interrupt j change i to j
stop return to main program
(void) continue
default value m=o, bypass interrupt system.

WINDOW a xmin xmax ymin ymax

Introduces a new window in the windowstack with an identifying name a, one alphabetical character. If a previously defined window has the same name, it will be overwritten, otherwise the new definition will be added to the stack.

STACK

The system writes a table with the window definitions.

DISPLAY k a x

The system displays window a on screenpart k, according to plotting mode x in which x may be n(natural), o(optimal) or r(real)
[see plotting mode definition].
The allowed values for k depend on the screentype definition.

DISPLAY k p x

The system displays picture p on screenpart k.

CURSOR a m k

A cursor defined window is added to the stack, the windowname is a, one alphabetical character, and the coordinates are estimated according to the window as is displayed on screenpart K for screentype m.
Second level commands:
X - return for left under corner,
followed by:
X return for right upper corner.
The cursor may also be set outside the specified window.

CLEAR

Erases screen cancels display stack and sets the line counter to zero.

EDIT

Erases screen and repeats the last display command for each screenpart. No messages are written, to allow for the editing and subsequent production of a report version on the hardcopy unit.
At the end of the displaying, the system stops and the user may introduce comments on the screen. The alpha-cursor may be placed in any position by the keys:

Tab	Move right
Backspace	Move left
LF	Move down
CTRL-K	Move up

Available character sizes:

KEYS	TOTAL LINES	NUMBER OF CHARACTERS PER LINE	ON SCRATCHPAD
ESC 8	35	74	16
ESC 9	38	81	18
ESC :	58	121	27
ESC ;	64	132	30

During the execution of the EDIT Command the interrupt, if any, is bypassed.
Both ASCII and APL characters may be used. However, character deletion is not possible.

END

Program exit.

Error Messages

The Tektronc program includes many tests on the validity of commands and status. Most of the messages are self explanatory. Continuation of the job is almost always possible.
The following list specifies the numbered error messages.

Syntax error n	n 28	The nth character in the command expression is erroneous
	n=28	Command expression is too long
	n=35	First 4 characters of command not recognized
	n=81	Command error at interrupt level
Error in displa n	n=83	requested windowname not present in stack
	n=84	requested screenpart erroneous
	n=85	check screentype
	n=86	plotting mode definition is wrong
	n=46	displaystack does not accept
	n=87	error at reading intermediate file
Cursor error n	n=53	requested screenpart not consistent
	n=54	requested screenpart is empty
	n=55	negative surface for defined window.

Invoking the system

The system runs under TSO. After logon one has to type command GRAPHIT, for the allocation of the necessary datasets.
After the 'READY' message type:
PLOTC name volume name = name of the intermediate file
volume = volume name where i.f. resides.

The users with access to a Tektronix 4015 terminal with the enhanced graphic option may use also the GRAPHIT version invoked by:

PLOTD name volume

This version has two additional commands:
ENHANCED, The system uses the full 4096 screenpoints.
NORMAL, Default, the system uses 1024 screenpoints.

Note: The existing interrogative version which is invoked by:
PLOT name volume
will remain available for some time.

Examples.

Some example are given as an annex to this article.

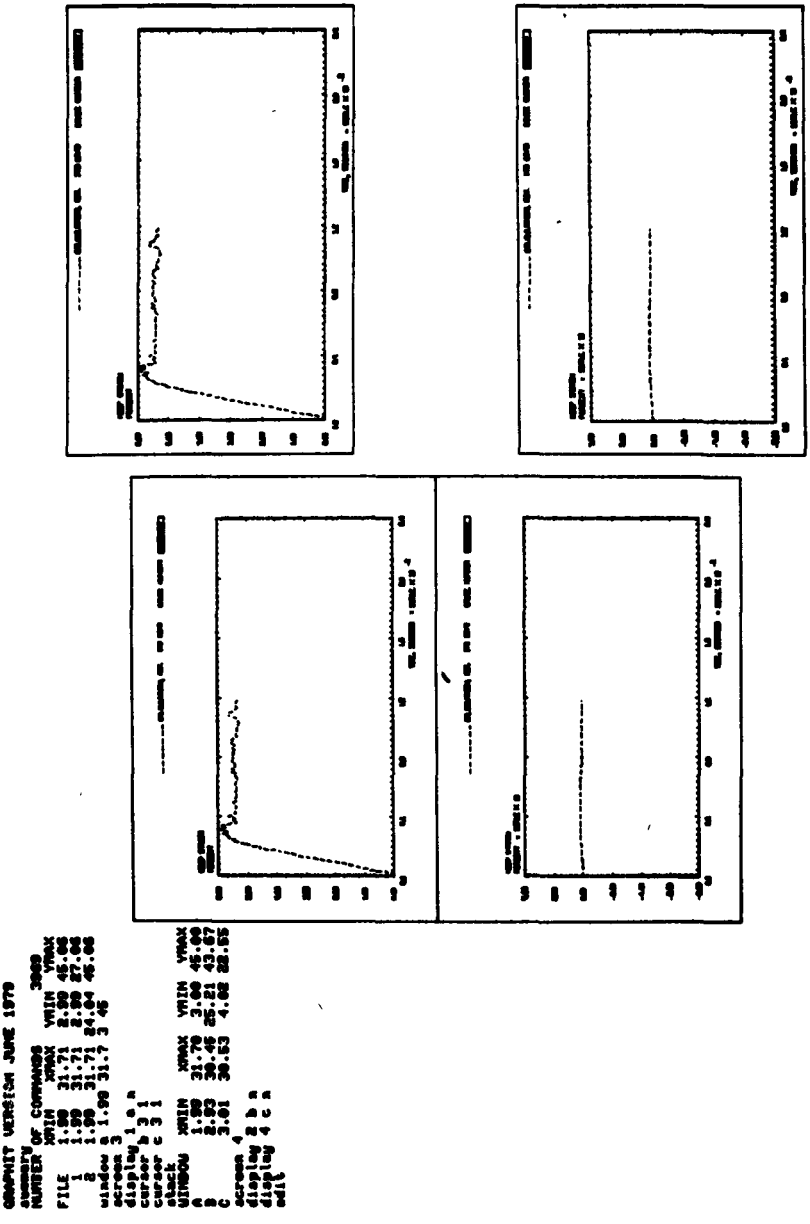
Example 1

The most simple use is presented by the following sequence:

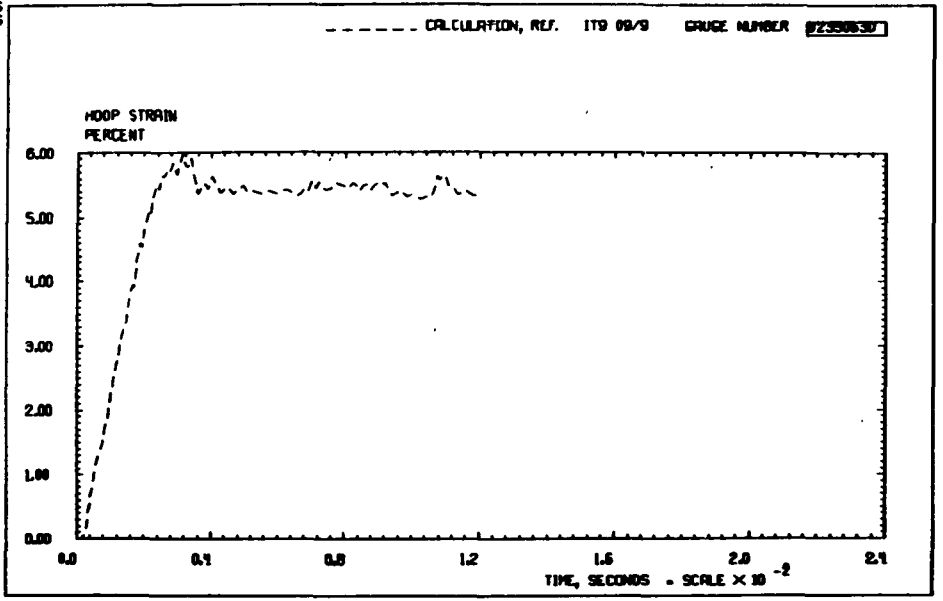
```
1) Summary
                XMIN   XMAX   YMIN   YMAX
   FILE         2.00   30.00  2.00   25.00
   No picture specification
2) Window A     2.00   30.00  2.00   25.00
3) Display 1 A N
```

- The summary command causes the writing of the summary table.
- The user defines a window (named A) with the same dimensions as the total drawing.
- The user asks for a display of the drawing using the window A.

Example 2


GRAPHIT VERSION JUNE 1979
NUMBER OF COMMANDS 3969
FILE 1 1.00 31.71 2.00 46.00
2 1.00 31.71 2.00 87.00
1.00 31.71 84.04 46.00
window a 1.00 31.7 3.46
screen 3
display 1 a a
cursor b 3 1
cursor c 3 1
clear
WINDOW XMIN XMAX YMIN YMAX
A 1.00 31.71 2.00 46.00
B 2.03 30.46 25.21 43.67
C 3.01 30.53 4.88 28.55
screen 4
display 2 b a
display 4 c a
exit

```
summary
NUMBER OF COMMANDS        3969
       XMIN    XMAX   YMIN   YMAX
FILE   1.99   31.71   2.99  45.06
   1   1.99   31.71   2.99  27.06
   2   1.99   31.71  24.04  45.06
stack
WINDOW   XMIN    XMAX   YMIN   YMAX
A        1.99   31.70   3.00  45.00
B        2.93   30.45  25.21  43.67
C        3.01   30.63   4.02  22.55
D        3.29   11.59  35.82  41.06
screen 1
display 1 b n
??
interrupt 0
```



AN ILLUSTRATION ON THE USE OF THE EDIT COMMAND

ALL THE TEKTRONIX KEYBOARD CHARACTERS MAY BE USED TO ADD INFORMATION
be careful because character deletion is not possible

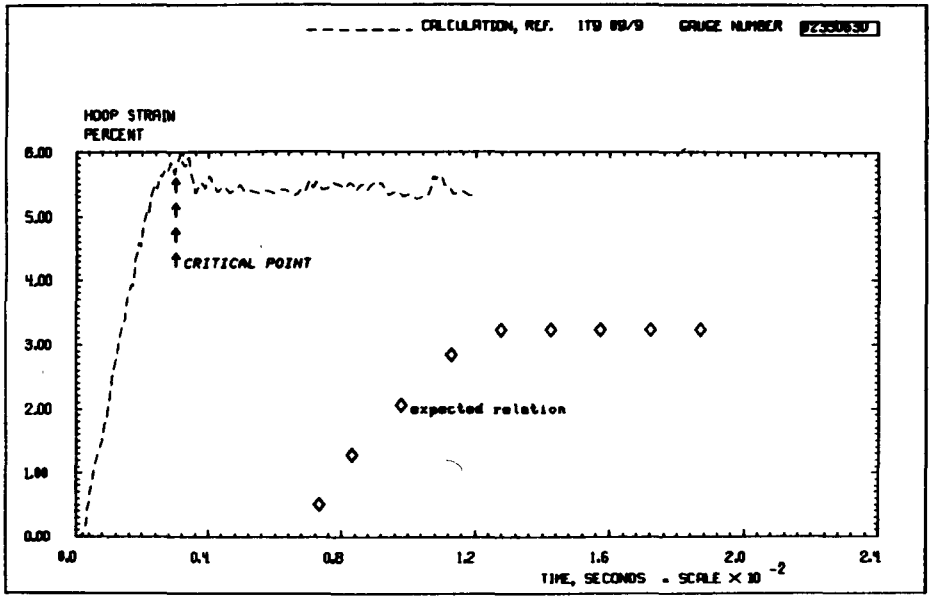


figure 1

The NAG Library
M. Dowell

Previous articles in the Newsletter (October 1977(15) and June 1978(22)) have described the mathematical and statistical subroutine libraries available at the JRC, Ispra Establishment. In the article of June 1978(22) it was stated that the NAG Library was to be ordered for use on the IBM System 370/165. After some contractual difficulties the NAG Mark 6 FORTRAN Library (single and double precision) was ordered and now the relevant documentation and the magnetic tapes containing the software have arrived at Ispra.
The User Support Group will be undertaking in the near future, a study to assist in deciding which elements will be included in the online library. An initial set will be defined which will be made available in the same way as the IMSL subroutines.

We would appreciate the views of users regarding their requirements for the inclusion of subroutines in the online library.
As with the IMSL Library, if the set of routines available online does not contain a solution for your particular problem, then you may consult the NAG Library Manual and select the appropriate routines. These routines will be implemented(in the online library) on request.

A copy of the NAG Library Manual is available for reference in the User Support Library. Users may inspect this documentation to assist them in the definition of their requirements.

Please may comments/requests either verbally or in writing to :

Mr. Martyn Dowell
Room 1861
Building A 36
Telephone 701

The NAG Library is structured in chapters using the conventions adopted by the American A.C.M. (Association for Computing Machinery) for the modified SHARE Classification Index.

Note Users should note that single routines of IMSL and NAG may absolutely not be distributed outside the JRC, Ispra Establishment. However, complete programs or software systems which make use of the libraries may be distributed. For these cases users may request only object decks of the incorporated routines.
The person who makes the request becames responsible for any misuse of the requested deck.

Summary of the

Contents of the chapters of the NAG MK 6 FORTRAN Library

A02 - COMPLEX ARITHMETIC
C02 - ZEROS OF POLYNOMIALS
C05 - ROOTS OF ONE OR MORE TRASCENDENTAL EQUATIONS
C06 - SUMMATION OF SERIES
D01 - QUADRATURE
D02 - ORDINARY DIFFERENTIAL EQUATIONS
D04 - NUMERICAL DIFFERENTIATION
D05 - INTEGRAL EQUATIONS
E01 - INTERPOLATION
E02 - CURVE AND SURFACE FITTING
E04 - MINIMIZING OR MAXIMIZING A FUNCTION
F01 - MATRIX OPERATIONS INCLUDING INVERSION
F02 - EIGENVALUES AND EIGENVECTORS
F03 - DETERMINANTS
F04 - SIMULTANEOUS LINEAR EQUATIONS
F05 - ORTHOGONALISATION
G01 - SIMPLE CALCULATIONS ON STATISTICAL DATA
G02 - CORRELATION AND REGRESSION ANALYSIS
G04 - ANALYSIS OF VARIANCE
G05 - RANDOM NUMBER GENERATORS
H - OPERATIONS RESEARCH
M01 - SORTING
P01 - ERROR TRAPPING
S - APPROXIMATIONS OF SPECIAL FUNCTIONS
X01 - MATHEMATICAL CONSTANTS
X02 - MACHINE CONSTANTS
X03 - INTERPRODUCTS

Statistics of computing installation utilization.
Report of computing installation exploitation
for the month of May 1979.

	YEAR 1978	YEAR 1979
General		
Number of working days	18 d	19 d
Work hours from 8.00 to 24.00 for	16.00h	16.00h
Duration of scheduled maintenance	21.37h	17.50h
Duration of unexpected maintenance	35.09h	15.08h
Total maintenance time	56.46h	32.58h
Total exploitation time	232.29h	271.42h
CPU time in problem mode	138.76h	129.09h
Batch Processing		
Number of jobs	5912	7116
Number of cards input	1462000	1614000
Number of lines printed	16858500	23391000
Number of cards punched	59759	125000
CPU time	135.04h	111.63h
Number of I/O (Disk)	15960000	18258000
Number of I/O (Magnetic tape)	3733000	4190000
T.S.O		
Number of LOGON's	579	3055
Number of messages sent by terminals	19830	166226
Number of messages received by terminals	79191	8577641
CPU time	1.74h	15.24h
Number of I/O (Disk)	239700	2745000
Connect time	243.19h	1847.73h
IMS		
Total time service is available	301.00h	230.79h
CPU time	1.98h	1.47h
Number of I/O (Disk)	381000	365800

Utilisation of computer centre by objectives and appropriation accounts for the month of May 1979.

		IBM 370/165 equivalent time in hours
1.20.2	General Services - Administration - Ispra	43.50
1.20.3	General Services - Technical - Ispra	2.22
1.30.3	Central Workshop	3.76
1.30.4	L.M.A.	-
1.90.0	ESSOR	12.67
1.92.0	Support to the Commission	2.87
2.10.1	Reactor Safety	130.51
2.10.2	Plutonium Fuel and Actinide Research	7.46
2.10.3	Nuclear Materials	6.58
2.20.1	Solar Energy	0.84
2.20.2	Hydrogen	2.90
2.20.4	Design Studies on Thermonuclear Fusion	7.57
2.30.0	Environment and Resources	14.79
2.40.0	METRE	0.73
2.50.1	Informatics	21.88
2.50.2	Training	-
2.50.3	Safeguards	17.19
	TOTAL	275.47
1.94.0	Services to External Users	12.73
	TOTAL	288.20

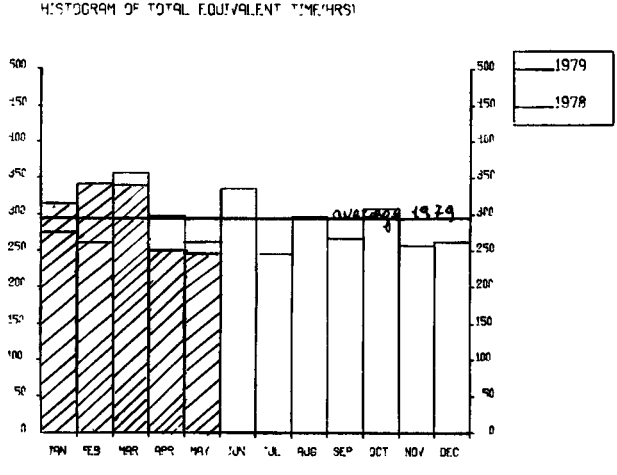
BATCH PROCESSING DISTRIBUTED BY REQUESTED CORE MEMORY SIZE

	100	200	300	400	600	800	1000	1200	1400	>1400
No. of jobs	1832	2344	1145	950	343	44	10	64	6	-
Elapsed time	66	159	142	190	78	26	1	20	1	-
CPU time	2.4	19.9	24.9	30.3	20.0	7.8	0.1	6.0	0.3	-
"Equiv" time	22	48	49	72	32	12	0	11	1	-
"Turn" time	0.4	1.5	2.4	2.6	4.5	5.4	4.5	4.1	4.1	-
I/O (disk)	2056	3744	3260	5303	1749	546	27	737	54	-
I/O (tape)	1591	758	326	1419	35	14	1	10	-	-

NOTE.
All times are in hours.
"Equiv" means equivalent.
"Turn" means turn around.
All I/O transfers are measured in 1000's.

PERCENTAGE OF JOBS FINISHED IN LESS THAN

TIME	15mn	30mn	1hr	2hrs	4hrs	8hrs	1day	2day	3day	6day
%year 1978	34	53	70	84	94	99	99	100	100	100
%year 1979	27	40	54	70	86	95	99	100	100	100



Projected total for 1979 = 3562 hours(using average).
Total for 1978 was = 3424 hours.

REFERENCES TO THE PERSONNEL/FUNCTIONS OF THE COMPUTING CENTRE.

Manager of The Computing Centre		J.Pire		
Responsible for User Registration	Ms.	G.Rambs		
Operations Sector				
Responsible for the Computer Room		P.Tomba		
Substituted in case of abscence by:		A.Binda-Rossetti		
Responsible for Peripherals		G.Nocera		
Systems Group				
Responsible for the group		D.König		
Substituted in case of abscence by:		P.A.Moinil		
Responsible for TSO Registration		C.Daolio		
			Room	Tele.
Informatics Support Sector				
Responsible for the Sector		G.Gaggero	1874	787
Secretary	Mrs.	G.Hudry	1873	787
Responsible for User Support		H.de Wolde	1883	1259
General Inf./Support Library	Mrs.	A.Cambon (See Note 2)	1871	730
Advisory Service/List of Consultants (See Note 1)			1870	730

A.Inzaghi, H.I. de Wolde, A.A.Pollicini, R.Meelhuysen, M.Dowell

NOTE 1. The advisory service is available in the same room as the Computing Support Library (room 1870). Exact details of the advisory service times for a specific week can be found at the head of any output listing (for that week).
Any informatics problem may be raised. However, the service is not designed to help users with problems which are their sole responsibility. For example, debugging of the logic of programs and requests for information which can easily be retrieved from available documentation.
If necessary, other competent personnel from the informatics division may be contacted by the consultant but not directly by the users.
The users should only contact the person who is the consultant for that specific day and only during the specified hours.
Outside the specified hours general information may be requested from Mrs. A. Cambon (see note 2) in the Computing Support Library.

NOTE 2. Mrs. Cambon is at present replaced by Mrs. C La Cognata.

HOW TO BECOME A REGULAR READER OF THE NEWSLETTER.

Persons interested in receiving regularly the "Computing Centre Newsletter" are requested to fill in the following form and send it to :-

Ms. A. Cambon
Support To Computing
Building 36
Tel. 730.

NAME .....

ADDRESS .....

.....

.....

TELEPHONE .....